

PROGRAM: Living With Fire MODULE: Fire Behavior Overview for the College Student

MODULE OVERVIEW:

Students often underestimate the force and intensity of a fire. This module seeks to provide students with an increased awareness relative to the danger of fire. As such, this program should not be presented or constructed as a definitive source of fire related instruction. Based on the limited nature of this lesson plan it should be expanded and or adapted to address local needs. Through case review, rapid fire growth is demonstrated..

GENERAL DESCRIPTION:

Living with Fire is a unique, student-centered project that seeks to determine and address the needs of the student relating to the dangers of fire in the college environment. As students, you must now be capable of independently making the correct choices that affect your ability to survive should a fire develop.

This program will establish a national source for college fire related information and produce a series of new activities, events and educational resources specific to the college student. If we are going to make a difference and reduce the tragic effects of fire, we need your candid conversation and honest input. During this focus group, please provide as much input and discussion when responding to a question or discussion. Your assistance will help us to create quality programs that will save lives.

DISCLAIMER:

This lesson plan may not address all of the issues, needs, requirements and policies of your college or university. It's objective is to provide a basis for the development of a lesson plan specific to your institution. The instructor **MUST** evaluate the relevancy of the information in this lesson plan to your local conditions and use it as a resource to modify as necessary to address local needs.

INTERNET REFERENCE SOURCES:

American Cancer Society
www.cancer.org

Campus Firewatch
www.campus-firewatch.com

National Electric Manufacturers Association
www.nema.org

National Fire Sprinkler Association
www.nfsa.org

NFPA International
www.nfpa.org

SimplexGrinnell
www.simplexgrinnell.com

United States Fire Administration
www.usfa.fema.gov

University of Texas System
www.utsystem.edu

INSTRUCTOR TIME GUIDE:

This lesson should not exceed fifty minutes inclusive of practical activities.

- 22 minutes – overview of fire behavior

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- 10 minutes – Living With Fire - fire growth video clip
- 18 Minutes – NFPA video – FirePower (relevant portions may be selected based on local conditions).

METHODS OF INSTRUCTION:

- Lecture
- Illustration
- Practical activities and demonstration
- Video presentation

RECOMMENDED MATERIALS, VISUAL AIDS & EQUIPMENT:

- Computer for PowerPoint presentation
- LCD projector
- Projection screen
- PowerPoint presentation – assembled from materials located on the Living With Fire website such as the Photo Library and video clips from the Live Burn
- Examples of items destroyed by fire
- VCR
- NFPA FirePower Video available from the NFPA (www.nfpa.org)
- Living With Fire student information bulletins

LEARNING OBJECTIVES:

- Provide the student with an overview of the nature of fire.
- Establish the unpredictable nature and rapid growth possible from fire.
- Provide the student with an overview of the risk associated with fire.
- Provide the student with an overview of how fire starts, spreads and how it can be stopped.

INSTRUCTOR NOTES

Rust – slow oxidation

Explosion – rapid oxidation

Flaming and smoldering states of fire

Demonstration – light a covered candle is shows a fire in equilibrium, place the top on the candle jar and the fire is extinguished as access to oxygen is removed.

Emphasize the potential of rapid fire spread. This can be illustrated by showing the living With Fire video segment available in the section Live Burn on the website.

Equilibrium vs. Fire Growth – draw an analogy between a candle and a pan of gasoline

Smoke is responsible for the majority of fire deaths

Provide current statistics from NFPA. These statistics can be obtained through the NFPA web site www.nfpa.org

Fire gases are often more than you can see.

Fire gases can effect the ability of the body to function and cloud your judgment in a fire situation

TEACHING POINTS**A. What is Fire**

1. Relevant examples of fire
2. Two types of fire – smoldering and flaming fire

B. The Fire Triangle – smoldering fire

1. Three essential ingredients:
 - Oxygen – 21 % in normal air, fire burns until about 16% and then smolders
 - Fuel
 - Heat

C. States of fuel

- A. Solid – paper, wood
- B. Liquid - gasoline
- C. Gas – natural gas, propane

D. Fire Growth

- A. Equilibrium
 1. Light a candle to show a fire in equilibrium
- B. Rapid growth
 1. Showing Living with Fire Dorm room video clip
- C. Show FirePower Video – 18 minutes
 - a. Point out the life saving features of sprinklers and smoke detectors and that neither one should be disabled or tampered with

E. What Does Fire Produce

- A. Smoke soot and particulates
- B. Heat – Temperatures up to 1200 degrees
- C. Gases – often poisonous these gases displace oxygen, compromises judgment
 - Carbon Monoxide
 - Hydrogen Cyanide

INSTRUCTOR NOTES

TEACHING POINTS

F. Time To Escape

A. Once a fire starts you may have two minutes or less to get out safely

G. Case Studies

1. Chapel Hill, North Carolina – May 1996, 5 students killed in a fraternity fire. A tragic fire at the University of North Carolina killed five students.

A number of significant factors contributed to the deaths, including a lack of sprinklers, open central stairwells and a lack of an alarm system.

2. Burlington, Vermont – November 2000, A fire in a house off-campus rented by five students injured three of the occupants.

The building where the fire occurred was a wood, balloon-frame structure with three stories. The building was equipped with smoke detectors, and there were two in the apartment of origin. One was located in the hallway by the bedroom, and the other was located in the living room.

An exterior and interior stairway led to the third floor. However, they were not separate or remote from one another.

There were three apartments in the building. In the apartment of origin, on the third floor, there were four bedrooms.

At 6:08 a.m., the fire department responded to the house for a reported fire. Upon arrival, they were told that there were people trapped on the third floor. Firefighters entered the building via the exterior stairway and had to crawl beneath the flames until they found one unconscious male. He was removed from the building and was in respiratory arrest.

Search operations continued and an unconscious female victim was found in one of the bedrooms. She was also removed from the building and was in respiratory arrest. A third victim was treated for injuries sustained when he and another male jumped from their bedroom windows onto the roof of a first story porch.

The fire was extinguished in 20 minutes, and damage was confined to the third-floor apartment. Damage was estimated to be approximately \$50,000.

The investigation determined that the fire started in the living room couch by improper disposal of smoking materials. There were the

INSTRUCTOR NOTES**TEACHING POINTS**

remains of alcohol bottles, candles and cigarettes found on the living room table.

According to fire officials, the fact that the stairways were not remote and separate was a contributing factor to one of the injuries that occurred.

H. Plan Your Escape

1. Know two ways out
2. Ensure that windows open easily
3. Know all building exits
4. Keep a flashlight near your bed

I. If Fire Strikes

1. React immediately
2. Test the door to see if it is hot
3. Crawl low in smoke
4. Get out and stay out
5. Dial 911 or your emergency number

J. Questions